

Claims

1. An injection device comprising:
  - a housing adapted to receive a syringe having a discharge nozzle and having a boot
  - 5 that covers its discharge nozzle, so that the syringe is movable between a retracted position in which the discharge nozzle is contained within the housing and an extended position in which the discharge nozzle extends from the housing through an exit aperture;
  - a releasable locking mechanism that retains the syringe in its retracted position; and
  - a housing closure member that can occupy a first position, in which it locates on the
  - 10 housing and prevents the locking mechanism from being released, and a second position, in which it does not prevent the locking mechanism from being released, the first position of the housing closure member being one in which it engages the boot, so that movement of the housing closure member to its second position results in removal of the boot from the syringe.
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2. An injection device according to claim 1 in which the first position of the housing closure member is one in which it closes the exit aperture to the discharge nozzle, and the second position is one in which it does not.
- 20 3. An injection device according to claim 1 or claim 2 in which the first position of the housing closure member is one in which it locates on the housing and the second position is one in which it does not.
4. An injection device according to any preceding claim in which the housing closure
- 25 member is a cap that locates onto the housing.
5. An injection device according to any preceding claim further comprising:
  - an actuator; and
  - a drive that is acted upon by the actuator and in turn acts upon the syringe to
  - 30 advance it from its retracted position to its extended position and discharge its contents through the discharge nozzle.
6. An injection device according to claim 5 in which the housing includes means for biasing the syringe from its extended position to its retracted position, further comprising:
  - 35 a return mechanism, activated when the drive has reached a nominal return position, to release the syringe from the action of the actuator, whereupon the biasing means restores the syringe to its retracted position.

7. An injection device according to claim 5 or claim 6 further comprising a release mechanism operable to release the locking mechanism, thus allowing the syringe to be advanced by the actuator from its retracted position to its extended position, and in which the first position of the housing closure member is one in which it prevents the release  
5 mechanism from being operated.

8. An injection device according to claim 7 in which the release mechanism is a primary member movable between locking and releasing positions and in which the first position of the housing closure member is one in which it covers the primary member.  
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9. An injection device according to claim 8 in which the locking position of the primary member is one in which it projects from the exit aperture and the releasing position is one in which it does not project from the exit aperture or projects from it to a lesser extent.  
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10. An injection device according to claim 9 or claim 10 in which the primary member is a sleeve.

11. An injection device according to any preceding claim in which the locking  
20 mechanism comprises a latch member that is located within the housing and is biased into a position in which it engages a locking surface and the release mechanism acts to move it from that position into a position in which it no longer engages the locking surface.

12. An injection device according to claim 9 or claim 10 in which the locking  
25 mechanism comprises a latch member that is located within the housing and is biased into a position in which it engages a locking surface, and the primary member includes a latch opening through which the latch member projects before it engages the locking surface, the primary member acting as a cam and the latch member as a cam follower, so that movement of the primary member from its locking position to its releasing position causes  
30 the latch member to disengage from the locking surface.

13. An injection device according to claim 12 in which the latch member includes a ramped surface against which a surface of the primary member acts to disengage it from the locking surface.  
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14. An injection device according to any one of claims 5-10 further comprising:  
a trigger movable from a rest position, in which it causes the drive to be retained in a position corresponding to the retracted position of the syringe, to an active position, in

which it no longer causes the drive to be so retained, thus allowing it to be advanced by the actuator and in turn to advance the syringe from its retracted position to its extended position and discharge its contents through the discharge nozzle; and

an interlock member movable between a locking position, at which it prevents  
5 movement of the trigger from its rest position to its active position, and a releasing position, at which it allows movement of the trigger from its rest position to its active position, the trigger thereafter being retained in its active position.

15. An injection device according to any one of claims 8-10 further comprising:  
10 a trigger movable from a rest position, in which it causes the drive to be retained in a position corresponding to the retracted position of the syringe, to an operative position, in which it no longer causes the drive to be so retained, thus allowing it to be advanced by the actuator and in turn to advance the syringe from its retracted position to its extended position and discharge its contents through the discharge nozzle; and

15 an interlock member comprising the primary member, the interlock member being movable between a locking position, at which it prevents movement of the trigger from its rest position to its active position and the primary member projects from the exit aperture, and a releasing position, at which it allows movement of the trigger from its rest position to its active position and the primary member does not project from the exit aperture or  
20 projects from it to a lesser extent, the trigger thereafter being retained in its active position.

16. An injection device according to claim 14 or claim 15, in which the trigger comprises a locking member that, in the rest position of the trigger, engages a locking surface of the drive and, in the active position, does not.  
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17. An injection device according to any one of claims 14-16 in which the trigger and the interlock member include a projection and an aperture, the projection being in register with the aperture when the interlock member is in its releasing position, but not otherwise, thus allowing the trigger to move from its rest position to its active position by movement  
30 of the projection into the aperture.

18. An injection device according to claim 17 in which the projection is on the trigger and the aperture is in the interlock member.

35 19. An injection device according to any one of claims 14-18 in which the trigger and another component of the device include a latching projection and a corresponding latching surface against which the latching projection latches when the trigger is in its active position.

20. An injection device according to claim 19 in which the latching projection is on the trigger.
- 5 21. An injection device according to claim 19 or claim 20 in which the said other component of the device is the interlock member.